

REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested. Claims 1, 2, 4-6 and 8-15 remain pending, wherein claims 1 and 15 are amended.

Claims 1 and 15 are objected to for minor informalities. Claims 1 and 15 have been amended in the manner suggested by the Office Action and withdrawal of this objection is respectfully requested.

Claims 1, 2, 4-6 and 8-15 are rejected for indefiniteness under 35 U.S.C. § 112, second paragraph. This ground of rejection is respectfully traversed.

The indefiniteness rejection focuses on the recitation of a four-dimensional histogram and a histogram cell. In particular, the rejection states that “it is unclear how the four-dimensional histogram is constructed” and “how the histogram cell is defined”.

The determination of definiteness turns on “whether the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art.”¹ It is respectfully submitted that the terms “four-dimensional histogram” and a “histogram cell” would have been clear to a person of ordinary skill in the art.

Applicants do not purport to have invented “four-dimensional histogram” and a “histogram cell”, but instead it is respectfully submitted that these terms would have been well-known to a person of ordinary skill in the art. This is evidenced by the article “Visual Recognition of Emotional States” by Schwerdt et

¹ M.P.E.P. § 2171.

al. (“Schwerdt”), cited to reject claims in a previous Office Action. Pages 46 and 47 of Schwerdt discuss the use of a “four-dimensional histogram” and a “histogram cell” in connection with recognizing facial expressions. In Schwerdt each dimension of the four-dimensional histogram represents one of four eigenvectors (i.e., 2nd, 7th, 8th and 11th eigenvectors) and includes a number of cells (i.e., 16 or 25 cells per dimension). In contrast to Schwerdt’s use of eigenvectors as dimensions of a four-dimensional histogram, Applicants’ claims use x-position, y-position, x-velocity and y-velocity as the four dimensions. Thus, it is respectfully submitted that one of ordinary skill in the art would have understood the terms “four-dimensional histogram” and a “histogram cell” in the context of Applicants’ claims.

The Office Action also states that it is “unclear how a comparison using a histogram cell is conducted.” Schwerdt, however, in the context of facial expressions discloses a comparison of eigenvectors to cells in a four-dimensional histogram in order to recognize facial expressions. In contrast, to Schwerdt’s comparison of eigenvectors to cells of a four-dimensional histogram for recognizing facial expressions, Applicants’ claims involve comparison of x-position, y-position, x-velocity and y-velocity to cells of a four-dimensional histogram to identify anomalies. Each cell is filled with a value representing a frequency of occupation in a four-dimensional space, where the frequency of occupation can be represented as $f[x\text{-position}, y\text{-position}, x\text{-velocity}, y\text{-velocity}]$, with f varying to represent the frequency of occupation of each combination of the x-position, y-position, x-velocity and y-velocity. Thus, one skilled in the art

would have understood how to perform the claimed comparison using histogram cells.

Finally, the Office Action concludes the recitation in the claims of histogram accumulating data representing normal pattern of behavior “implies that all tracks within the video images are ‘normal’ and any subsequent comparisons of the tracks within the video images would be classified as ‘normal’.” Applicants’ claims, however, recite that the accumulation of data to identify the normal pattern of behavior is performed using “an iterative learning process” and then the histogram populated during this learning process is used to identify abnormalities. Thus, Applicants claims do not result in all tracks being classified as normal, but instead only those tracks, which when compared to data accumulated during a learning process, having a frequency of occupation of a histogram cell not above an occupancy threshold.

For at least those reasons set forth above, it is respectfully submitted that the use of the terms “four-dimensional histogram” and “histogram cell” do not render the claims indefinite. Accordingly, the indefiniteness rejection should be withdrawn.

The Office Action includes the following obviousness rejections under 35 U.S.C. § 103(a):

- Claims 1, 2, 8-12, 14 and 15 are rejected for obviousness under 35 U.S.C. § 103(a) in view of the combination of the article “Application of the Self-Organising Map to Trajectory Classification” by Owens et al. (“Owens 2000”) and the article “Novelty Detection in Video Surveillance Using Hierarchical Neural Networks” by Owens et al. (“Owens 2002”).

- Claim 13 is rejected for obviousness under 35 U.S.C. § 103(a) in view of the combination of Owens 2000, Owens 2002 and U.S. Patent No. 4,198,653 to Kamin (“Kamin”).
- Claim 4 is rejected for obviousness under 35 U.S.C. § 103(a) in view of the combination of Owens 2000, Owens 2002, and U.S. Patent No. 6,411,328 to Franke et al. (“Franke”).
- Claim 5 is rejected for obviousness under 35 U.S.C. § 103(a) in view of the combination of Owens 2000, Owens 2002 and U.S. Patent No. 5,546,474 to Zuniga (“Zuniga”).
- Claim 6 is rejected for obviousness under 35 U.S.C. § 103(a) in view of the combination of Owens 2000, Owens 2002 and U.S. Patent No. 7,058,205 to Jepson et al. (“Jepson”).

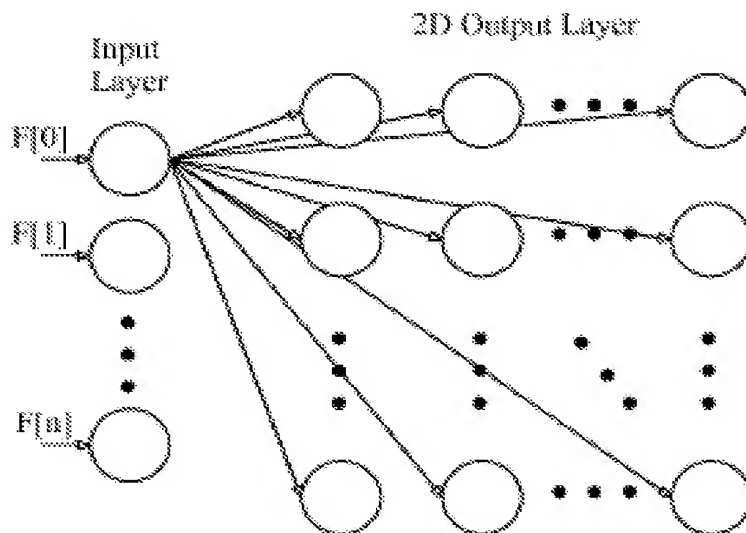
For at least the following reasons, these grounds of rejection are respectfully traversed.

Applicants’ claim 1 is not rendered obvious by the combination of Owens 2002 and Owens 2000 because this combination does not disclose or suggest the use of a four-dimensional histogram and a frequency of occupation of histogram cells in the manner recited in claim 1. In particular, claim 1 requires:

1. accumulating data representing the behavior of the tracks in a ***four-dimensional histogram***; and
2. that the comparison process classifies a track according to a comparison of the ***frequency of occupation of a histogram cell*** with an occupancy threshold.

The Office Action acknowledges that Owens 2000 does not disclose the use of a four-dimensional histogram and histogram cells, but concludes that this would have been obvious in view of the two layer neural network of Owens 2000. The neural network of Owens 2000 does not disclose or suggest a four-dimensional histogram, and more significantly does not involve a comparison of a frequency of occupation of a histogram cell with an occupancy threshold.

Owens 2000 discloses that each element of a feature vector, represented by $\mathbf{F}=[x,y,s(x),s(y),s(dx),s(dy),s(|d^2x|),s(|d^2y|)]$, is input into a respective unit of a self-organizing map (such as that of Figure 4 of Owens 2000 (reproduced below)) in order to identify a “winning neuron”.² Owens 2000 then compares the *Euclidean distance* between the feature vector and the winning neuron’s exemplar vector to a threshold value to determine if this *distance* exceeds a threshold value.³



Those skilled in the art would have recognized that a neural network, such as that disclosed by Owens 2000, is not a four-dimensional histogram. For example, the present application discloses that a neural network can be used instead of a four-dimensional histogram.⁴ Apart from Applicants’ own disclosure, there is no evidence that one skilled in the art would have concluded

² Page 5.

³ Page 6.

⁴ Pages 14 and 15.

that the neural network of Owens 2000 renders obvious the claimed four-dimensional histogram.

Additionally, the use of a Euclidean distance in Owens 2000 is not the same as the claimed frequency of occupation of a histogram cell. For example, the present specification discloses that ***distance*** from a corresponding histogram cell to the nearest above occupancy threshold cell can be used ***in addition to*** an occupancy threshold.

Apart from discussing how Owens 2000 uses a neural network, the Office Action provides no explanation of why one skilled in the art would have concluded that the use of ***Euclidean distances*** in a neural network renders obvious the use of ***a frequency of occupancy of a histogram cell in a four-dimensional histogram***. In the absence of such reasoning, the Patent Office has not established a *prima facie* case that one skilled in the art would have found the claimed use of a four-dimensional histogram obvious in view of the neural network of Owens 2000.

Owens 2002 is cited solely for the disclosure of generating an alarm, but like Owens 2000, does not render obvious the claimed use of a four-dimensional histogram and frequency of occupation of a histogram cell. Accordingly, the rejection of claim 1 should be withdrawn.

Claim 15 recites similar elements to those discussed above with regard to claim 1, and is patentably distinguishable over the current grounds of rejection for similar reasons. Claims 2, 4-6 and 8-14 are patentably distinguishable over

the current grounds of rejection at least by virtue of their dependency. Accordingly, the obviousness rejections of claims 1, 2, 4-6 and 8-15 should be withdrawn.

If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 038819.55861US).

Respectfully submitted,

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